REMARKS

Applicant thanks the Office for its indication that the Restriction Requirement dated March 27, 2002 between Group I, claims 1-20, and Group II, claims 21-24, has been withdrawn. In response to the above-identified Office Action, Applicant has amended claims 1-4, 6-15, 18, 20, 21, 23 and 24, and canceled claims 5, 22 and 25-40. Support for the amendments to the claims can be found in the above-identified application at page 1, lines 6-13, page 3, lines 4-14, page 5, lines 2-5, page 7, lines 10-14, and page 8, lines 8-14. As such, no new matter has been entered by way of these amendments. In view of these above amendments and the following remarks, Applicant hereby requests further examination and reconsideration of the application, and allowance of claims 1-4, 6-21, 23 and 24.

The Office has rejected claims 21 and 24 under 35 U.S.C §102(b) as being clearly anticipated by U.S. Patent No. 5,444,905 to St. Clair ("St. Clair"). Applicant hereby respectfully traverses the rejection for the following reasons.

St. Clair does not anticipate or suggest "variably control[ling] the ... pitch of the coil ... according to ... selected spring profiles," as recited in claim 21. Applicant directs the Office's attention to FIGS. 10, 11 and 13, and col. 5, lines 37-62 of St. Clair, which disclose a bending roller 81 that bends a wire 15 into a curve to form a coil. Further, and referring now to FIG. 14 and col. 6, lines 3-31, the coil diameter assembly 80 includes cams 84, 85 that engage a cam follower 86. The movement of the cam follower 86 is in response to the particular configuration of the cam, which ultimately causes a linkage to move the coil diameter roller 81 according to that configuration. But the assembly 80 operates using only one set of cams 84, 85 at a time, and therefore the diameter of the coils is not controlled according to selected spring profiles.

Applicant refers back to FIG. 13 and further directs the Office's attention to col. 5, lines 45-54. Movement of a spreader cam 91 along a horizontal axis in a "Z" direction as wire 15 passes along side the cam 91 affects the degree to which the convolutions in the coil are spread apart. Specifically, and referring now to FIG. 15 and col. 7, lines 6-13, the pushing action of a spreader cam 25 engages cam followers 94, 95 for pivoting linkage 96 to cause spreader bar 92, and hence cam 91 shown in FIG. 13, to move forward and rearward for more or less spreading. Thus, the configuration of a particular spreader cam 25 ultimately

determines a spring's shape. But these spreader cams 25 must be replaced to provide different spring shapes, as stated at col. 7, lines 31-34. Therefore, the spreader cam 91 does not spread apart the convolutions in the coil according to several spring profiles.

The invention disclosed in the above-identified application uses a program logic controller 8 that selects spring profiles during spring production making it very easy to produce springs of differing form in batches. The spring profiles are stored in data arrays or tables and include data that determine the position of the finger 4 and the spreader 5 during coiling, as disclosed at page 3, lines 10-22 in the application. The controller 8 facilitates this process by being able to alter the orientation of the finger 4 and spreader 5 to provide variable control of the pitch of the springs as indicated by the spring profiles. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claim 21. Since claim 23 depends from and contains the limitations of claim 21, it is patentable in the same manner as claim 21.

Additionally, St. Clair does not anticipate or suggest a "pocketed coil spring assembly having a plurality of different pitches in a middle portion between end portions of the coil which is produced in accordance with the method of Claim 21," as recited in claim 24. Applicant directs the Office's attention to col. 5, lines 55-62, col. 6, lines 33-44, and FIGS. 10 and 11 of St. Clair. The diameter of the coil springs in the middle portion 9 is greater than the diameter at the end portions 8. Further, the convolutions are spaced apart less at the end portions 9 than at the middle portion since it may be desireable to provide a coil spring which includes a full and complete revolution at the end portions 8 of the springs. But the coil spring produced in the manner described in St. Clair does not result in having a plurality of spring profiles in the middle portion. The present invention produces coil springs that have defined spring profiles throughout the length of the spring between the end portions. Thus, a single spring formed in one batch could have different compression characteristics appropriate to the particular part of the mattress, such as the head, foot or mid-region portions, for example. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claim 24.

The Office has rejected claim 24 under 35 U.S.C. §102(b) as being clearly anticipated by U.S. Patent No. 4,439,977 to Stumpf ("Stumpf"). Applicant hereby respectfully traverses the rejection for the following reasons.

Stumpf does not anticipate or suggest a "pocketed coil spring assembly having a plurality of different pitches in a middle portion between end portions of the coil which is produced in accordance with the method of Claim 21," as recited in claim 24. Applicant directs the Office's attention to Stumpf at col. 7, lines 1-3, which discloses that the coil convolutions adjacent the opposite ends of the coil springs 36 have a smaller diameter than the intermediate coil convolutions. But the coil spring produced in the manner described in Stumpf does not result in having a plurality of spring profiles in the middle portion. As mentioned earlier, the present invention produces coil springs that have defined spring profiles throughout the length of the spring between the end portions so that a single spring formed in one batch could have different compression characteristics as appropriate, for example. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claim 24.

The Office has rejected claims 1-23 under 35 U.S.C. §103(a) as being unpatentable over Stumpf in view of U.S. Patent No. 4,112,721 to Takase et al. ("Takase"). Applicant hereby respectfully traverses the outstanding rejections for the following reasons. The Office asserts that Stumpf discloses an apparatus for the production of pocketed coil springs, but concedes that Stumpf fails to disclose a programmable control means operably linked to coiling elements to control their positions and orientation. The Office asserts, however, that a programmable controller for controlling a coiling process is disclosed in the Takase reference, and therefore that it would have been obvious to one of ordinary skill in the art to employ the programmable controller of Takase in the pocketed coil apparatus of Stumpf for automatic control and adjustment of a coiling process.

Neither Stumpf nor Takase, alone or in combination, anticipate or suggest a "plurality of stored data arrays or tables, each data array or table has a spring profile representing a plurality of ... orientations of said ... coiling element[s] for a particular spring configuration," as recited in claim 1 or "control[ing] the ... pitch of the coil ... according to ... selected spring profiles," as recited in claim 21. Applicant respectfully directs the Office's attention to FIG. 1 and col. 6, lines 14-38 of Takase. Takase discloses a numerically controlled coil spring manufacturing apparatus. The apparatus shifts a pitch tool 22 from an initial position to a predetermined position in a short time, and the pitch of a coil spring

increases drastically from a closely coiled section (i.e., a pitch close to zero) towards a section to be given a predetermined pitch. The pitch of the coil spring at the terminal end portion is then decreased suddenly from the predetermined pitch back to the level corresponding to the close coiling. Thus, the pitch tool 22 moves "rapidly" or "drastically" from a position that leads to close coiling to a position that corresponds to the predetermined pitch. Applicant now directs the Office's attention to Takase at col. 10, lines 46-54. Control data for manufacturing coil springs, such as pitch and diameter data, is inputted into the main memory 210 using a keyboard 200. But the control data inputted into the main memory 210 represents a single spring profile and does not represent choosing at least one from a plurality of spring configurations of the coil spring, since the pitch tool 22 in fact attempts to eliminate variation of pitch along the length of the spring between the ends as explained above.

As noted by the Office, Stumpf does not disclose a programmable control means. Accordingly, Stumpf does not disclose an apparatus having a plurality of stored data arrays or tables that each include a spring profile representing a particular spring configuration. Thus, even if there was a motivation to combine the Takase and Stumpf references, the combined teachings would still fail to disclose or suggest all of the limitations recited in claims 1 and 21 as discussed above. The present invention stores a plurality of spring profiles in data arrays or tables that each determine the position of the finger 4 and the spreader 5 during coiling, as stated at page 3, lines 10-22 in the application. The program logic controller 8 selects the spring profiles during spring production to provide complete flexibility and continuous control of the form of the spring throughout the length of the spring. For instance, a series of springs that are encapsulated as disclosed in the above-identified application for use in a mattress, for example, could be formed with different compression characteristics appropriate to the particular part of the mattress, such as the head, foot or mid-region portions. Thus, the diameter and pitch of the spring may be varied to easily and quickly produce springs of convoluted and specialized forms.

Further, neither Stumpf nor Takase, alone or in combination, anticipate or suggest a "profile selection system that selects at least one of a plurality of ... spring profiles that the programmable control system uses to alter said ... coiling elements," as recited in claim 1 or "selecting at least one of a plurality of spring profiles ..., each selected spring profile represents a plurality of positions or orientations of the coiling elements," as recited in claim 21. Applicant refers the Office back to Takase at col. 10, lines 46-54, which discloses

control data being inputted into the main memory 210 as discussed above earlier. But there is no mechanism that stores control data for different spring profiles, let alone mechanisms for selecting a spring profile from a plurality of available spring profiles. Each time a different type of spring is desired to be made, different spring profile data would have to be inputted into the memory 210. This arrangement precludes manufacturing springs with complex profiles requiring large amounts of different control data.

Thus, combining the teachings contained in Stumpf and Takase, even if there was a motivation to do so, would still fail to teach these limitations. The invention disclosed in the above-identified application provides data arrays or tables that store a plurality of spring profiles as stated at page 3, lines 10-22 in the application. The program logic controller 8 can select spring profiles during spring production making it very easy to switch between different spring profiles and to produce springs of differing form in batches. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 1 and 21. Since claims 2-4 and 6-20 depend from and contain the limitations of claim 1, and claim 23 depends from and contains the limitations of claim 21, they are patentable in the same manner as claims 1 and 21.

Additionally, neither Stumpf nor Takase, alone or in combination, disclose or suggest "electromagnets engaging each spring as it leaves the coiling unit to substantially dampen excessive oscillation in each spring," as recited in claim 6. Referring to Takase at FIG. 8 and col. 9, lines 1-32, the magnets 138*a*, 138*b* cause the rocker arms 134*a*, 134*b* to move for opening and closing the passage 128 thereby allowing coil spring 28*b* to pass through one of passages 130*a*, 130*b*, 130*c*. But the magnets 138*a*, 138*b* do not engage the springs 28*b*, and are not intended to dampen oscillations of the springs 28*b*. Stumpf does not teach magnets at all, nor any means for dampening excessive oscillations of the coiled springs. Referring to the above-identified application at page 4, lines 9-16, when producing long springs at high speeds, excessive oscillations in the springs can result in machine stoppages. This problem can be reduced or eliminated by dampening excessive oscillations using magnets to engage the springs as they exit the coiling section. As a result, pocketed spring assemblies of greater depth can be manufactured that have increased comfort for users of assemblies, such as mattresses, which incorporate the pocketed springs assemblies. As such, the Office is respectfully requested to reconsider and withdraw the rejection of claim 6 for this additional reason.

Still further, neither Stumpf nor Takase, alone or in combination, disclose or suggest "the programmable control system ... linked to the encapsulation section, to control movement of material through the encapsulation section," as recited in claim 7. Applicant respectfully directs the Office's attention to Takase at FIG. 1 and col. 4, lines 4-10, where a microcomputer 80 is illustrated and disclosed. The microcomputer 80 controls movement of a coiling point 20 and a pitch tool 22 during coil spring formation. But Takase does not teach the microcomputer 80 controlling movement of a material through an encapsulation section since there is no encapsulation section disclosed at all in Takase for the microcomputer 80 to control and move the coil spring 28 through. Referring to FIG. 8 and col. 8, lines 57-61, the structure and operation of the selecting device 50 arranged within the coil spring manufacturing apparatus in FIG. 1 is illustrated and described. In particular, a coil spring 28*b* is simply dropped into the device 50 once it is cut from the wire 28, and therefore does not proceed to an encapsulation section.

As noted by the Office and discussed above earlier, Stumpf does not disclose a programmable control system. Referring back to Stumpf at FIG. 10 and col. 8, lines 9-39, an inserter plunger 232 is moved by an air cylinder 234, which is activated by the control switch 224, to insert a compressed spring 36 into a fabric strip 26. But the master timing control 196, which is not even a programmable control system, does not cause the coil spring 36 to advance from the coiler 38 to the spring compressor assembly 42. Moreover, the timing control 196 does not control movement of the spring from the spring compressor assembly 42 to the spring inserter. Thus, combining the teachings contained in Takase and Stumpf, even if there was a motivation to do so, would still fail to teach a programmable control system linked to an encapsulation section to control movement of material through an encapsulation section.

Conventionally, synchronization is achieved by a complex arrangement of cams and gears, as stated at page 1, lines 14-17 in the above-identified application and discussed above in connection with the cited references. Applicant directs the Office to the above-identified application at page 2, lines 13-19, where it states that the programmable control synchronizes operations of the apparatus, thereby eliminating change cams, gears and clutches, for example. As a result, the present invention provides for reducing the time for changing between products to seconds rather than hours. The controlled, synchronized movement of the material from the coiling section to the encapsulation section, and through

the encapsulation section, makes this possible. As such, the Office is respectfully requested to reconsider and withdraw the rejection of claim 7 for this additional reason.

In view of the foregoing remarks and amendments, Applicant submits that claims 1-4, 6-21, 23 and 24 stand in condition for allowance.

In accordance with 37 CFR § 1.121, attached hereto is a marked-up copy of the changes made to the claims by the current amendment. The version with markings to show changes made is located in the attached Appendix A.

In view of all of the foregoing, it is submitted that this case is in condition for allowance and such allowance is earnestly solicited. In the event that there are any outstanding matters remaining in the above-identified application, the Office is invited to contact the undersigned to discuss this application.

Respectfully submitted,

Date: January 8, 2002

John Campa
Registration No. 49,014

NIXON PEABODY LLP
Clinton Square, P.O. Box 31051
Rochester, New York 14603
Telephone: (585) 263-1519
Facsimile: (585) 263-1600

Certificate of Mailing - 37 CFR 1.8(a)
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: U.S. Patent and Trademark Office P.O. BOX 2327 Arlington, VA 22202 on the date below.
Date 1-8-03 Suzanne Ciaio

APPENDIX A

Version With Markings to Show Changes Made

In reference to the amendments made herein to the claims, additions appear as underlined text while deletions appear as bracketed text, as indicated below:

IN THE CLAIMS:

Claims 5, 22 and 25-40 have been canceled.

Claims 1-4, 6-15, 18, 20, 21, 23 and 24 have been amended as follows:

1. (Amended) An [Apparatus] apparatus for the production of a pocketed coil spring[s] having a predetermined spring profile, said apparatus comprising:

a coiling section in which [a] the coil spring is formed from wire fed to the coiling section, said coiling section comprising a wire feed by which wire is drawn through said coiling section, a first coiling element which controls a diameter of the coil spring, a second coiling element which controls a pitch of the coil spring, a first drive by which first positions or first orientations of the first coiling element can be altered, a second drive by which second positions or second orientations of the second coiling element can be altered, [coiling elements whose position and/or orientation determines the form of said coil, and]

an encapsulation section in which the coil spring is inserted between juxtaposed sheets of material and in which the sheets of material are joined together to form a pocket enclosing the coil spring, and

[wherein said apparatus further comprises] a programmable control [means] system operably linked to said first and second drives to alter the first positions or the first orientations of said first coiling element and the second positions or the second orientations of said second coiling element as the wire is fed through said coiling section, a profile of a coil spring being defined by movement of said first coiling element and said second coiling element as the wire is fed through said coiling section, said programmable control system comprising a plurality of stored data arrays or tables, each data array or table has a coil spring profile representing a plurality of the first positions or a plurality of the first orientations of said first coiling element and a plurality of the second positions or a plurality of the second orientations of said second coiling element for a particular coil spring configuration, said programmable control system having a profile selection system that selects at least one of the

plurality of the data arrays or the tables corresponding to selected spring profiles that the programmable control system uses to alter said first and second coiling elements [coiling elements thereby to control the position and/or orientation thereof].

2. (Amended) Apparatus as claimed in Claim 1, wherein the programmable control [means] system comprises a programmable logic controller by which computer-numerical-control of the coiling section is achieved.

3. (Amended) Apparatus as claimed in Claim 2, wherein the programmable logic controller [actuates drive means by which the positions and/or orientations of the coiling elements can be altered] is operably linked to a third drive by which the wire feed can be controlled.

4. (Amended) Apparatus as claimed in Claim 3, wherein said [drive means comprises three motors, one for the wire feed rolls, one for a coiling element which controls the diameter of the spring, and one for a coiling element which controls the pitch of the spring] first, second and third drives each comprise a servo-motor.

6. (Twice Amended) Apparatus as claimed in Claim 1, wherein one or more electromagnets are mounted at the exit of the coiling [unit] section, said one or more electromagnets engaging each spring as it leaves the coiling [unit] section to substantially dampen excessive oscillation in each spring, said spring being mechanically drawn away from said one or more electromagnets as said spring is conveyed to the encapsulation section.

7. (Twice Amended) Apparatus as claimed in Claim 1, wherein the programmable control [means] system is also operably linked to the encapsulation section, to control movement of material through the encapsulation section.

8. (Amended) Apparatus as claimed in Claim 7, wherein a servo motor operably linked to the programmable control [means] system controls movement of the material through the encapsulation section, such that said material is advanced in increments corresponding to [the] a desired pocket width.

9. (Twice Amended) Apparatus as claimed in Claim 1, wherein [the means] a mechanism by which the springs are transferred to the encapsulation [unit] section and inserted between the sheets of material comprises:

a rotating wheel with radially extending arms, successively formed springs being engaged by successive arms of said wheel;

[means for compressing] a spring compression system that compresses the springs as they are conveyed to the encapsulation section on the arms of said rotating wheel; and

a reciprocating cassette into which the compressed springs are delivered by said wheel and within which the compressed springs are transported to the encapsulation section.

10. (Twice Amended) Apparatus as claimed in Claim 1, [which] further [comprises] comprising ultrasonic welding [means] units by which the sheets of material are joined together to form pockets.

11. (Amended) Apparatus as claimed in Claim 10, wherein said ultrasonic welding [means] units comprises longitudinal welding [means] units arranged parallel to the longitudinal axis of the sheets of material and transverse welding [means] units arranged transverse to said axis.

12. (Twice Amended) Apparatus as claim in Claim 10, wherein said ultrasonic welding [means] units comprises ultrasonic welding horns with castellated lower edges.

13. (Amended) Apparatus as claimed in Claim 11, wherein said transverse welding [means] units comprises a pair of welding horns arranged colinearly.

14. (Twice Amended) Apparatus as claimed in Claim 12, [wherein means are provided for alteration of the] further comprising a positioning system that alters a position of the transverse welding [means] units on said longitudinal axis of said sheets of material.

not in dwgs

15. (Twice Amended) Apparatus as claimed in Claim 10, wherein the ultrasonic welding [means] units comprise ultrasonic welding horns, at least one of which acts against a fixed anvil provided with a surface coating which acts as a cushion for said welding horn.

18. (Twice Amended) Apparatus as claimed in Claim 1, wherein said sheets of material are drawn through the encapsulation section by [means of] a pair of horizontally disposed rollers, at least one of which is driven by a servo motor controlled by the programmable control [means] system.

20. (Twice Amended) Apparatus as claimed in Claim 1, wherein said encapsulation section further comprises a transport [means] system for drawing said sheets of material incrementally through the encapsulation section and a welding [means for welding] system that welds the sheets of material together,

wherein the transport [means] system and the welding [means] system are controlled by the programmable control [means] system.

21. (Amended) A method of producing a pocketed coil spring[s], [which] the method [comprises the steps of] comprising:

[(a) setting the positions and/or orientations of coiling elements in the coiling section of apparatus as claimed in any preceding claim,]

[(b)] feeding wire through [the] a coiling section so as to form a coil,

selecting at least one of a plurality of spring profiles obtained from data arrays or tables stored in a programmable control system, each selected spring profile represents a plurality of positions or orientations of the coiling elements of said coiling section for a particular spring configuration, N. M.

using the programmable control system to alter the positions or the orientations of the coiling elements to control the diameter and the pitch of the coil as the wire is fed through said coiling section according to the selected spring profiles, N. M.

[(c)] separating said coil from said wire,

[(d)] compressing said coil,

[(e)] inserting said coil between juxtaposed sheets of material, and

[(f)] joining said sheets of material together so as to encapsulate said coil.

23. (Twice Amended) A method as claimed in Claim 21, wherein the positions [and/or] or orientations of the coiling elements are set by one or more servo motors operating under control of the programmable control [means] system. N.M.

24. (Twice Amended) A pocketed coil spring assembly having a plurality of different pitches in a middle portion between end portions of the coil which is produced in accordance with the method of Claim 21. N.M.